Assessing Potential Non-Economic Loss & Damage from Climate Change

Partnership with the Bad River Band of the Lake Superior Chippewa Indians

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Under the United Nations Framework Convention on Climate Change (UNFCCC), *non-economic loss and damage* (NELD) has emerged as a new concept to capture the full extent of potential loss or damage of factors that cannot be captured in monetary terms reflecting their true meaning. Factors such as loss of cultural heritage and loss of identity are not always addressed in planning documents, and yet their potential loss can make a permanent impact on the well-being of a community.

This study examines potential non-economic loss and damage from changes to the environment affecting the Bad River Band of the Lake Superior Tribe of Chippewa Indians, a Native American community in northern Wisconsin. The assessment identifies sources of resiliency within the community and is intended to inform the community's climate action planning. The assessment also adds to the international policy-making discourse surrounding NELD.

We conducted 20 semi-structured ethnographic interviews of a cross-section of tribal members in order to assess participants' overall connection to the environment, their involvement in traditional practices, and the impact of potential cultural loss due to climate change.

Findings

- *Cultural Importance of Selected Species*: Participants described the cultural value of resources such as wild rice, walleye, maple and birch trees, medicinal plants, and deer, and how these resources play a role in building community, passing on traditions, as well as connecting to the land and their Native ancestry.
- *Relationship to the Environment*: Many tribal members were keenly aware of the interconnectedness of species and the importance of protecting every species from harm. The community's relationship to the environment is grounded in values of reciprocity and commitment to stewardship. Treaty rights play an important role in reinforcing this connection.
- *Potential Impacts of Adverse Environmental Events*: With reduced availability of ceremonial natural resources, tribal members may be unable to carry on cultural traditions. Loss of existing food resources may accelerate the substitution of traditional foods with store-bought foods and lead to added physical health risks. Loss of traditional lifestyles also has mental health implications.
- *Adaptation and Resilience*: Participants revealed a willingness to modify behavior (such as travelling to the ceded territories or substituting species) in order to continue valued practices. Others spoke instead of the ability to effect change through collective action (e.g., organized advocacy). The responses to the threat of environmental change were grounded in self-identification as resilient and adaptive communities.

Implications for Bad River Band

- The inclusion of personal reflections from members of the community in climate monitoring plans can help account for the risks to cultural heritage from climate change. The material is particularly useful in communicating to non-tribal members (e.g., collaborators such as federal and state agencies) the incommensurable value of these natural resources.
- Aside from accounting for climate change risk to cultural practices, the collected narratives can help determine climate change adaptation and mitigation approaches in accordance with how the community values the resource. To make this determination, it is important to ascertain whether it is the species or the practice that is more important to the community.
- The study also highlights tribal strengths in its rich oral tradition and its history of resilience in the face of forced assimilation and ongoing discrimination.

Implications for Future NELD Research

- Aside from environmental stressors, marginalized communities face issues of social inequality. As in the case of the Bad River Band, socio-economic challenges are entangled with environmental challenges. They play a role in determining the community's response to climate change. To understand the impact of NELD, researchers must take a holistic view of the community and not study environmental impacts in isolation.
- Different cultures have different rules about sharing traditional knowledge with outsiders. NELD researchers from outside the community must be sensitive to this dynamic.
- Community natural resource management practices may not align with different management practices in use by state and federal governments. NELD researchers must recognize such different management practices in order to effectively account for ongoing community efforts to avoid potential losses.
- This study relied on qualitative data and collaborative research methods. Such research requires adequate time and patience to gain consent and build trust with the community. NELD research with similar methodologies cannot be done properly without sufficient time investment and partnership building.

"These people wanted to get into an argument about how much the crop was worth in dollars and cents, and I said that's not even a legitimate question. Because it concerns a lot more: our culture, our lifestyle, our spirituality. So, it's priceless. We can't put a price on it. We won't. It's not for sale."

Introduction

Most climate change research focuses on measuring potential economic loss from changes in the environment. There is growing recognition in the international community that economic assessments do not capture the full extent of potential loss or damage from climate change and other environmental stressors. The concept of *non-economic loss and damage* includes adverse health impacts, reduction in biodiversity, loss of indigenous knowledge, cultural heritage, loss of identity or sense of place resulting from the destruction of culturally important landscapes or built sites. These factors are not effectively addressed in national or international policy frameworks, although researchers and policy-makers have begun to evaluate their importance.

We set out to learn about potential non-economic loss and damage that may be experienced by members of the Bad River Band of Lake Superior Chippewa, a Native American community in northern Wisconsin. This paper reports on our research, cataloging certain natural resources of particular cultural importance to the Bad River Band and describing the implications of our research for both the Bad River Band and future researchers of non-economic loss and damage.

Background

What is Non-Economic Loss and Damage (NELD)?

In the face of environmental stressors and climate change, there can be losses that are both material and non-material; some that can be assessed through economic valuations, and others that are harder to measure and quantify through market metrics. For instance, in the event of flooding, while lost earnings from arable agricultural land can be quantified, the loss of ties to the land due to relocation of the community cannot. If the crop and the arable land lost in the flooding are the foundation of a community's culture, lifestyle, spirituality, or sense of place, then attaching a monetary value can be meaningless or defeat the purpose (e.g., a friendship bought is not a friendship). These factors are not always addressed in planning documents, and yet their potential loss can make a permanent difference to the well-being of a community.

Under the United Nations Framework Convention on Climate Change (UNFCCC), *non-economic loss and damage* (NELD) has emerged as a new concept in the negotiations to address this issue.[1] NELD refers to services and provisions that cannot be traded in markets or quantified in monetary terms. These are irreplaceable resources that often hold a high symbolic value and are central to the social cohesion of a community. They are often left out of climate risk assessments and adaptation planning due to their unquantifiable nature.[2] Even though they might be vital to those who suffer the losses, they can go unnoticed. Failure to measure and account for these losses results in insufficient decision-making on climate mitigation and adaptation. Accounting for these potential losses can re-prioritize the monitoring of natural resources and improve adaption and mitigation planning.

In 2013, the 19th UNFCCC Conference of Parties (COP19) established the Warsaw International Mechanism (WIM) to address losses and damages associated with climate change.[3] In subsequent years, an initial work plan was approved for the WIM Executive Committee and NELD became part of this work plan.[4] In terms of NELD, the work plan includes enhancing understanding by gathering of data and knowledge on non-economic losses. Thus the international policy process on NELD is still evolving. As institutional arrangements are made to address NELD under the UNFCCC, it has become increasingly crucial that sound research on the topic guide the policy process.

Current research specifically focusing on NELD can be divided into two broad categories: (i) conceptualization of NELD and (ii) case studies of NELD. The conceptual studies have discussed how difficult it is to measure NELD. There is no universal unit that can be used to express NELD items and the value placed on these items are highly context dependent.[5] Various qualitative and semi-quantitative strategies to assess NELD have been suggested (e.g., risk indices, multi-criteria decision analysis).[6] Valuation methodologies (such as contingent valuation) and their limitations are discussed.[7] To date, a case study showing empirical evidence

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[1] Serdeczny, O., Waters, E., & Chan, S. (2016). *Non-Economic Loss and Damage in the Context of Climate Change. German Development Institute.* Retrieved from https://www.die-gdi.de/uploads/media/DP_3.2016.pdf.

[2] Morrissey, J., & Oliver-Smith, A. (2013). Perspectives on non-economic loss and damage: Understanding values at risk from climate change. *Loss and Damage in Vulnerable Countries Initiative Report* (K. Warner & S. Kreft, Eds.).Retrieved from http://loss-and-damage.net/download/7308.pdf.

[3] UNFCCC. (2013). *Report of the Conference of the Parties on its nineteenth session, held in Warsaw from 11 to 23 November 2013. Addendum. Part two: Action taken by the Conference of the Parties at its nineteenth session.* Retrieved from http://unfccc.int/resource/docs/2013/cop19/eng/10a01.pdf.

[4] UNFCCC. (2014). *Report of the Executive Committee of the Warsaw International Mechanism for Loss and Damage associated with Climate Change Impacts.* Retrieved from http://unfccc.int/resource/docs/2014/sb/eng/04.pdf.

[5] *E.g.,* Serdeczny, *et al*. (2016).

[6] Fankhauser, S., Dietz, S., & Gradwell, P. (2014). *Non-economic losses in the context of the UNFCCC work programme on loss and damage (policy paper)*. London School of Economics, Centre for Climate Change Economics and Policy, Grantham Research Institute on Climate Change and the Environment. Retrieved from http://eprints.lse.ac.uk/64554/1/Fankhauser-Dietz-Gradwell-Loss-Damage-final.pdf.

[7] Morrissey, *et al*. (2013).

of NELD has been carried out in eight villages in Bangladesh.[8] A recent study comparing NELD in Japan and Bangladesh has also been conducted to show failure to adequately account for NELD in disaster risk reduction strategies and climate change adaptation reports.[9]

Our research contributes to this growing body of literature by using qualitative methods to assess potential non-economic loss and damage among the Bad River Band of the Lake Superior Tribe of Chippewa Indians. While findings from analysis of one community cannot be generalized to others, case studies such as ours create recognition of the presence of NELD in diverse communities and help develop rules to assess NELD.

Bad River Band of Lake Superior Chippewa Indians

Our partner, the Bad River Band of Lake Superior Chippewa Indians, is a federally-recognized Native American tribe with approximately 8,000 registered members, including about 1,700 members living on the reservation. They are part of the much larger Lake Superior Ojibwe group of over 300,000 in the United States and Canada and are related to the Anishinaabe group of North American indigenous peoples that also includes the Ottawa, Potawatomi, and Algonquin peoples.[10] They are part of the Anishinaabe group of North American indigenous peoples that also includes the Ottawa, Potawatomi, and Algonquin peoples.

The reservation of the Bad River Band covers 125,000 acres of land in northwestern Wisconsin on the southern shore of Lake Superior (*Gitchi Gami*), the largest freshwater lake in the world, as well as two hundred acres on the northern tip of Madeline Island (*Moningwunakauning*), the longtime cultural center of the Ojibwe. Over 90% of this land remains undeveloped, including 40 miles of shoreline along Lake Superior. The Kakagon Sloughs, wetlands covering 16,000 acres, have been designated a National Natural Landmark and Wetland of International Importance under the Ramsar Convention on Wetlands. These wetlands contain the largest area of natural wild rice beds in the Great Lakes basin, which have been a source of physical and spiritual sustenance for generations of Ojibwe.

Through a series of treaties in the mid-1800s between the United States and the Ojibwe bands, the Ojibwe ceded lands in Northern Michigan, Wisconsin, and Minnesota to the federal government, while retaining the rights to hunt, fish, and gather in the ceded territories.[11] Efforts

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[8] Andrei, S., Rabbani, G., & Khan, H. I. (2015). *Non-economic loss and damage caused by climatic stressors in selected coastal districts of Bangladesh*. Bangladesh: Bangladesh Centre for Advanced Studies. Supported by the Asian Development Bank. Retrieved from http://www.icccad.net/wp-content/uploads/2016/02/ADB-Study-on-Non-Economic-Losses-and-Damages-Report_Final-Version-Reduced-File-Size.compressed1.pdf.

[9] Chiba, Y., Shaw, R., & Prabhakar, S. (2017). *Climate change-related non-economic loss and damage in Bangladesh and Japan*. International Journal of Climate Change Strategies and Management. Retrieved from: doi:10.1108/IJCCSM-05-2016-0065.

[10] Chippewa and Ojibwe generally are used interchangeably.

[11] Bad River Band. (2006). *History: A Brief Bad River History*. The Bad River Band of Lake Superior Chippewa Tribe. Retrieved from: http://www.badriver-nsn.gov/history.

to resist being forcibly removed further west culminated in the Treaty of 1854, which established permanent reservations in the region, including what is now the Bad River Reservation. It is important to note that—unlike many other tribes—the Bad River Band selected their reservation land from lands they had historically occupied since at least the time of first contact with the Europeans. Accordingly, the Band's connection to its reservation lands (and the ceded territories) dates back significantly longer than if the Band had been forced to relocate to a reservation outside of its historical territory.

For decades, the rights of the Ojibwe people were systematically abused. Efforts like the General Allotment Act of 1887 (the Dawes Act), as well as the Treaty of 1854 itself, broke up reservation lands, allotting small parcels to Native Americans deemed suitably "civilized" and selling off the remainder to white settlers. Forced assimilation efforts, along with boarding and mission schools, disrupted traditional ways of life, the effects of which continue today. The rights to hunt, fish, and gather in the ceded territories and even to access the ceded territories were ignored and denied, often forcibly.[12]

Beginning in the 1960s and 1970s, a reassertion of tribal rights brought conflicts with the state and federal governments. In 1983, a federal court re-affirmed the rights enshrined in the treaties. Nonetheless, a series of violent conflicts with non-Native individuals and communities over fishing rights in the ceded territories ensued in what was known as "The Walleye War." Following more rounds of litigation, the courts finally ruled in favor of the Ojibwe retaining their treaty rights. The affirmation of off-reservation hunting, fishing, and gathering rights demonstrated the importance of preserving access to these natural resources and maintaining Ojibwe rights and cultural practices.[13] It was also during this time that the Great Lakes Indian Fish & Wildlife Commission (GLIFWC) was established to manage and protect the off-reservation treaty rights on behalf of its eleven-member Ojibwe tribes.

The many natural resources found on the reservation are vital to the teachings, practices, lifestyles, and livelihoods of members of the Bad River Band.[14] According to tribal teachings, the Great Spirit told the Band's ancestors, who lived on the Atlantic Coast, to move to the place where "the food grows on water." After a series of stops along the St. Lawrence River, they settled in the Great Lakes region where they found wild rice—or *manomin*, the "food that grows on water"—along the lakes and rivers. They continue to harvest the wild rice for sustenance and as food used in ceremonies, feasts, and other gatherings.

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[12] Nesper, L. (2002). T*he Walleye War: the struggle for Ojibwe spearfishing and treaty rights*. Lincoln: University of Nebraska Press.

[13] Loew, Patty, and James Thannum. "After the Storm: Ojibwe Treaty Rights Twenty-Five Years after the Voigt Decision." *The American Indian Quarterly*, vol. 35, no. 2, Mar. 2011, pp. 161–91.

[14] Bad River Band. (2011, July 11). *Bad River Band of the Lake Superior Tribe of Chippewa Water Quality Standards*. Retrieved from http://www.badriver-nsn.gov/tribal-operations/natural-resources/announcement-a-alerts-natural-resources/291-announcements-natural-resources.

According to the tribe's teachings, water (*nibi*) is the lifeblood of the earth and connects the past, present, and future generations. In addition to wild rice, the water provides other resources such as walleye (*ogaa*), lake sturgeon (*name*), and other fish and waterfowl, and a means of travel. Furthermore, tribal members traditionally hunt deer, gather nuts and berries, tap maple trees for sugar, and harvest birch bark for canoes and handicrafts.

Respect for Mother Earth, which incorporates a deep respect for the natural systems that sustain the tribe's culture, are important components of the tribe's harvesting, hunting, fishing, and gathering practices. Accordingly, before taking something from Mother Earth, tribal members typically will offer loose tobacco (*asemaa*) in gratitude. Moreover, this respect means not taking from the Earth more than you need and ensuring that the land and water will be there for future generations. This is sometimes referred to as the Seventh Generation Principle, pursuant to which a decision made today should consider the affect it might have on seven generations into the future.

Environmental Threats on the Bad River Reservation

The Reservation has a humid, continental climate with distinct seasons which sustains different habitat types—coastal habitats, inland aquatic habitats, and upland habitats. Of particular interest among the coastal habitats, the Kakagon and Bad River Sloughs consists of diverse plant species and extensive wild rice beds.

Changing lake levels, more frequent and intense storms, and vector-borne diseases could affect coastal habitats and result in loss of wild rice beds, loss of breeding and nursery areas for fish, and loss of habitat and food for migratory birds. Increased water temperatures could affect inland aquatic habitats and result in a reduction of cold water fish such as walleye; the spread of warm water fish such as the non-endemic sea lamprey; and an increase in habitat suitability for invasive species such as Atlantic salmon carp and non-endemic plants such as narrow-leaved cattails.[15] Higher air temperature and changes in precipitation patterns could affect upland habitats and may cause the replacement of tree species such as birch and maple by tree species from forests further south. These natural resources not only have subsistence and ecological value, but are also culturally important to the Bad River Band and other Ojibwe bands in the region.

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[15] Minnesota Sea Grant. (n.d.). Lake Superior's Non-Native Species (100). Retrieved November 07, 2017, from http://www.seagrant.umn.edu/ais/superior_nonnatives.

In addition to these climate change risks, other environmental threats have included a controversial open-pit iron-ore mine proposal in the Penokee-Gogebic Range located upriver, as well as five oil and gas pipelines that run through the reservation. Earlier in 2017, the Bad River Band Tribal Council declined to renew the easement for Enbridge Line 5, an aging pipeline that continues to carry over 500,000 barrels of crude oil per day across the reservation and nearby lands. Moreover, many threats, such as concentrated animal feeding operations (CAFOs), to Bad River's water and air come from nearby communities.

Scope and Methodology

We set out to develop a framework for analyzing NELD and a proof-of-concept field test with a Native American community facing environmental threats. We made initial contact with the Tribal Historic Preservation Officer and Climate Change Coordinator of the Bad River Band of Lake Superior Chippewa in March 2017. We traveled to the Bad River Reservation in April 2017, to meet with them, receive their feedback on the project, and seek approval to engage with community members. We were committed to creating a project that was culturally appropriate, relevant, and would add value to the Bad River Band's current efforts in climate change adaptation and cultural preservation. Our project proposal (Appendix A) was presented to the Bad River Tribal Council and approved in late April 2017.

The data collection and interview structure were developed to assess participants' overall connection to the environment and past and current involvement in traditional practices. Such practices include wild rice harvesting, hunting, gathering, and other practices that involve the use of natural resources on the reservation and within the ceded territories. The Bad River Reservation Seventh Generation Climate Change Monitoring Plan was referenced to identify specific species at risk and practices of cultural importance to the community. The demographics form (Appendix D) outlines the specific information collected from each participant. This form asked participants to differentiate between practices they had done previously and what they are currently involved in. It also guided our interview questions. The anonymized responses have been aggregated in Appendix E.

Before initiating any interviews, we went through the University of Michigan Institutional Review Board (IRB) process to ensure that our work conformed to federal, state, and university policies regarding the protection of human research subjects. The IRB notified us that the project would not require ongoing IRB oversight since it involved minimal-risk, noninvasive data collection that would not allow participants to be identified. (IRB Number: HUM00128659).

Our project team conducted fieldwork on Bad River Reservation from July 19 to August 27. During this period, we facilitated semi-structured interviews with members of the Bad River Band. The Interview Guidelines (Appendix B) were used to ensure that facilitation was culturally sensitive and maintained a consistent approach. Each of the interview participants reviewed a project overview and signed a consent form (Appendix C). Participants were free to stop the interview at any time and were provided small gifts (<$20) in gratitude for their participation.

We worked in conjunction with tribal leadership, Tribal Historic Preservation office, and Bad River Natural Resources Department to identify individuals who were willing to participate in our study.

We recorded interviews with 20 participants. Participants were a mix of men and women, elders and non-elders, all of whom lived on the reservation or within a 10-mile radius. Interviews were typically 30-60 minutes long and were video or audio recorded. We held the majority of the interviews in the Chief Blackbird Building (also known as the Administration Building), and occasionally interviewed participants in their homes or the Elderly Center.

Along with interviews, we attended community events and met with professionals working in the fields of tribal heritage, tribal leadership and administration, natural resource management on the reservation and with the Great Lakes Indian Fish & Wildlife Commission.

In addition to collecting information about traditional practices, the semi-structured interview sought to measure current or potential personal, family, or cultural loss and damage due to climate change and environmental stress. Our questions (Appendix B) were open-ended and were designed to allow the interviewee to respond freely based on their knowledge and experience. These questions were structured to capture participants' relationship to the land, to understand how or if climate change is affecting their daily lives, and to discover the degree to which climate change impacts their culture. Follow-up questions were based on responses provided by the participant. In this way, the interview format was an open structure that was largely guided by the interviewee.

Throughout this process, the privacy and autonomy of our research participants and the Bad River Band was of utmost importance. All audio and video recordings are being returned in full to the Tribal Historic Preservation Office. No names or identifying information have been used or will be used in connection with files, reports, presentations, or articles about our research. The use of the terms "tribal member" or "tribal elder" throughout specify an individual perspective or experience by an enrolled member of the Bad River Band of Lake Superior Chippewa. The use of the word "community" throughout the paper is meant to describe the tribal members living on or near Band River Reservation. When using the "band," we are referring specifically to the Bad River Band and we use the term "tribe" to refer to a connection to the larger Ojibwe and Anishinaabe identities and beliefs.

Findings

As we evaluated our interviews, we identified eleven macro-level themes addressed by participants and coded the interviews accordingly. Table 1 provides a list of themes and their descriptions. The remainder of this section discusses our findings in detail, showing how interviewee responses illustrated these themes.

Table 1:
Overview of codes used in analyzing interview content

THEME	DESCRIPTION
Cultural Importance of Wild Rice	Migration story, how rice is used and shared, ceremonies for self, family, or community
Cultural Importance of Fish	Species: walleye, brook trout, perch
Cultural Importance of Trees	Species: birch, maple, ash, cedar; Practices: basket-weaving, canoe-making, use of knocking sticks, sugaring
Cultural Importance of Plants	Medicinal and edible, roots and berries, sage, sweet grass
Cultural Importance of Game	Species: deer, rabbit
Cultural Importance of Other Species	Additional uncategorized species: duck, swan, owl, eagle, turtle, muskrat, mosquito, clam, wolf
Relationship to the Environment	Reciprocity, connection of all species to one another, stewardship of the land, ties to waterways, specific ties to Bad River Reservation, giving tobacco in gratitude
Treaty Rights	Sovereignty, access to off-reservation resources, politics, social justice
Cultural Impact of Adverse Event	Sense of loss or loss of teachings due to mining, pipelines, non-sustainable harvesting, or climate change or environmental stressors
Other Impacts of Adverse Events	Economic, physical health, mental health, subsistence living, food sovereignty
Adaptation & Resilience	Perceived ability to adapt to changes and adverse events

Cultural Importance of Selected Species

Wild Rice

Wild rice (*manomin*, meaning "good seed" or "good berry") is a sacred food for Anishinaabe people. As shared by one elder, "it's one of the signs that were given to the people in dreams and visions on the migration journey. They were told they would be home when they came to the place where food grows on water." (Participant 3). The prophecy of the food that grows on water (rice) is an important teaching indicating why the Ojibwe people settled in the Great Lakes region. Wild rice therefore represents not only a food source for tribal members, but also a connection to the land, to *Gitchi Manidoo* (the Great Spirit or Creator), and to their native ancestry. Several participants made statements affirming the importance of wild rice to the community:

- You have to understand that rice is a staple food source here. It's done at every significant event, any feasts in the community, funerals, birthdays, holidays – there's always wild rice. (Participant 12).
- Rice is more than food. It's that belonging to the earth, that we all belong to. And it's giving something to us through the Lord, the Creator to sustain us. (Participant 9).
- The value of being able to go out and harvest it [wild rice]. When you're there, you feel your ancestors that were there before you. Knowing that is very important to me. (Participant 16).

Tribal members described the rice beds as sacred and important to protect. They also connected the health and well-being of the community to the health of the rice beds:

- The wild rice has always been very important to us as part of our being, as part of not just food for our bodies, but food for our souls. (Participant 9).
- To me it [wild rice] just represents life…perseverance in a historical context too. . . . It is definitely a connection and a love. (Participant 17).

While the significance of wild rice continues, the traditional harvesting practices have changed over time. Elders described traditional practices of drying, scorching, and dancing on the rice to remove the husk. While harvesting processes have changed to include machines, the ceremonial traditions of the rice harvest have been largely preserved. Such traditions include the seasonal celebration of first fruits, the offering of tobacco to the spirits in the Kakagon Sloughs, and the annual *manomin* powwow. Participants explained these traditions as follows:

- You don't go out there and just start harvesting. You put your *asemaa*, your tobacco, in the water and you offer prayers. When you bring in the first fruits of any harvest, whether it be maple syrup or berries or wild rice or fish or any kind of wild game, we call it the offering of the first fruits. (Participant 3).

- Before we harvest, we put out a dish to the spirits that are in the sloughs, that are all around us. [This is] for protection and safety of what we're harvesting, for water, and to say we are grateful for that abundance of food that was given to the Anishinaabe. Wild rice is the reason my people are here in this area. (Participant 1).

Based on water levels and decreased abundance of wild rice, the Tribal Council made the difficult decision to close the rice beds for harvesting in 2007 and 2012, for the first time in living memory. Tribal members described the harvest ban as a challenging experience for the community. They recognized the value in allowing the rice beds to replenish, but tribal members said it was difficult to manage the scarce supply during those years. In order to ensure that rice was available for ceremonies and gatherings, tribal members had to significantly reduce the amount of rice they had at ordinary meals. Some members were able to go to the ceded territories to find other sources of wild rice, although there was a strong preference for the taste and nutritional value of rice grown in the Kakagon and Bad River Sloughs compared to other sources.

Fish

Fishing is a central practice to tribal members and those who fish do so using a variety of practices, including hook-and-line, netting, and spearing. While the walleye is the widely-preferred species with a cultural importance approaching that of wild rice, interviewees also mentioned fishing for several other species, such as perch, sturgeon, trout, and carp.

Walleye is a sacred food for Anishinaabe people. Like wild rice, it is used in ceremonies and was historically an abundant resource. Walleye have *tapetum lucidum* (reflective, pearlescent eyes) that make them easier to see when spear-fishing at night. The physical attributes of the walleye are incorporated into tribal teachings and explain the origin of cultural practices:

> Walleye in particular has a really important story with us and they're also one of the fish that their eyes glow at night. And that's not by any coincidence. We were always told that's why; they are giving themselves to us that way. We have a long history of fishing at night and that's why. (Participant 10).

Trees

Trees play a prominent role in the culture of the Ojibwe people, providing resources for a variety of traditional practices, including maple sugaring, canoe-making, and basket-weaving. Specific species play a prominent role in the lives of the tribal members, such as maple, birch, ash, and cedar.

Maple sugaring provides an ingredient for cooking and an opportunity for tribal members to bond with family members and friends. One tribal member described sugaring with her family: "Doing that with my children is probably the most important thing . . . . I think going through that process with them, from the starting moment of giving that tobacco, and then explaining to them the story of maple sugaring and how we got to doing it." (Participant 7). Many members noted that maple syrup is often used for gifting among tribal members and is also a required part of certain ceremonies.

Birch and ash have many uses for the Ojibwe, providing the raw materials for making baskets, lacrosse sticks, toboggans, snowshoes, burial urns, bowls, and other craft items. Many traditional stories involve birch, and birch canoe-making is an ancient traditional practice that has been passed down from generation to generation. When considering the loss of access to birch on Bad River Reservation, one participant described:

> [Without birch,] our young people . . . may never fully experience what it is like to harvest that birch, from that first cut to sitting in that canoe on one of our rivers, in one of our lakes here like our Anishinaabe people have done for thousands of years. I really don't think that's replaceable in any way shape or form, those feelings that you get from doing that . . . . It's our chance to rekindle or maintain that relationship we have with the *manidoog*, with the spirits. (Participant 10).

Cedar also plays a central role in the harvesting of wild rice because it is lightweight and especially useful as a ricing stick. Even while members use modern boats to harvest in the sloughs, they continue to use traditional cedar ricing sticks to knock the rice (to separate the grains from the stalks).

Plants

Tribal members spoke of gathering a variety of plants, berries, and nuts, including strawberries, blackberries, raspberries, potatoes, wintergreen, yellowroot, and mushrooms. The cultural importance of plants can be seen in the fact that some months of the year are named according to the harvest occurring at that time. *Odemiini-giizis* ("Strawberry Moon"), for example, begins in the month of June, and represents the harvest of strawberries. Likewise, *Iskigamizige-giizis* (Sugarbushing Moon) season begins in April and *Manoominike-giizis* (Ricing Moon) in late August.

"It's not the resources that are dependent on us, it's the other way around. I think too many people forget that nowadays."

The Ojibwe name for Bad River, *Mashkiki Ziibi* means "Medicine River," referring to the abundance of medicinal plants that grow on its banks. These plants have medicinal and spiritual uses that go beyond the nutritional value they might offer.

Some tribal members spoke of the medicinal value of plants such as yellow root. One participant recalled from her childhood: "I can remember my grandma—she had this bag of roots. She used to hang them behind her door in her bedroom. If you had a sore throat, she would go break off a piece of it . . . . You would chew it for a while." (Participant 13). Another participant spoke of the need to pass on knowledge of plants to her children and grandchildren:

> If we can't harvest the deer because of chronic wasting [disease], or the fish because of hemorrhagic bleed-outs they have, or the avian flu is coming and you can't eat the birds, so then you better know your plants. Because perhaps what you're going to have to survive on in the future would be what you can grow, if you can't eat the hooved, the winged, or that which is in the water. And it's just skills and knowledge that I think they need for the future. (Participant 4).

Game

Historically, hunting practices have included hunting (with bow or gun), trapping, and snaring. Anishinaabe people have long hunted deer, moose, fox, bear, and other mammals. Traditionally, these mammals were sources of food, clothing (tanned hides), and tools (bones and antlers). Our interviews predominantly focused on deer hunting.

The meat of white-tailed deer is considered a sacred, traditional food and is included in ceremonies. It is also an important lean, healthy food source. The first kill ceremony is conducted when a young hunter, typically male, kills their first deer or large game. The ceremony is symbolic of a young person becoming an adult hunter and provider for their family and community:

- We have what we call a first kill ceremony. I do those ceremonies. That's when a young man makes his first deer and is welcomed into the ranks of the adult hunters. (Participant 3).
- Young men, young hunters, they become men too, by being providers for their community. So killing that first deer embodies that idea of giving and generosity in our community…you're not allowed to eat any of the deer. You give it all out to the community, your family, your extended family, and you feed your people, literally. (Participant 10).

The act of hunting is also an important recreational and communal pastime. Tribal members feel a sense of connection to their hunting partners and to their ancestors that hunted and trapped in the woods before them: "One of the things I enjoyed about hunting, besides providing food on the table, was having that chance to go out with my relatives . . . . I wouldn't go hunting alone, I would always go out with four or five others and we'd make our hunt and we'd get our deer . . . walking through the woods, I always thought about the ones before me, walking that same ground." (Participant 16).

Other Species

Certain species of birds are also culturally important to the Ojibwe. The swan, in particular, was described as being connected to wild rice and having a role in signaling the start of spring: "They are the first ones to come here . . . when you first hear those thunders come rolling in in the spring." (Participant 11). The swan is also honored as part of a traditional swan dance. Likewise, both the turtle and the muskrat are featured in the Ojibwe creation story. Explained one interviewee, "Supposedly the turtle is how we originated here—on the backs of a turtle—and a muskrat finally got down to the bottom of the water and came up with these grains of sand and established where [the Apostle Islands] are today." (Participant 15).

Another respondent explained that the turtle was also used to help the Ojibwe track time: "Originally, Anishinaabe people did not have an alphabet and a written language. They'd take the shell of the snapping turtle, and there are thirteen sections on the back of the snapping turtle. And you'd use that as a calendar, and you could tell the story of what you'd be doing during each one of those moons." (Participant 3).

One member also described the importance played by the wolf in Anishinaabe teachings: "[T]he wolf has a lot to do with native prophecy. If the wild places no longer exist, the wolf has no place to retreat. If the wolf passes out of existence, then pretty soon Anishinaabe and all other humans will soon follow. That's a part of our prophecy." (Participant 3).

Relationship to the Environment

In addition to specific species, tribal members discussed a broader connection to the environment overall. They described notions of the interconnectedness of all species, reciprocity, stewardship of the land and specific ties that they have to the Bad River Reservation.

Interconnectedness of All Species

Many tribal members are keenly aware of the interconnectedness of species in the environment and the resultant harm that would occur if one or more species were harmed or lost. One tribal member shared, "I think that anytime a species leaves for whatever reason, there are effects, because I believe everything is connected . . . ." (Participant 5). Another participant reflected, "We are all connected, how could we not be? You walk on it [the land] every day . . . . You breathe the air, drink the water, you walk on the ground everyday." (Participant 17).

One participant shared her perspective on the relationship among species:

> Everything is connected . . . it is the perch, and only the perch, that the Atlantic elliptical clam is reliant on to release its egg . . . . [The egg] doesn't attach to the gills of the walleye or the gills of other species, except for the perch . . . . When the egg of the Atlantic elliptical clam decides to hatch, it hatches and drops. And that's where it stays for the rest of its life. . . . [The] clam stays in the bed of the river . . . and it keeps the bed in place. And in keeping the bed in place, it keeps the channel of the river in place . . . [which means] there is the exact amount of water that is needed for wild rice to grow. Without that little Atlantic elliptical clam, without the perch, we don't have wild rice. (Participant 12).

Another participant highlighted this interconnection, drawing special attention to the diminished role of humans: "We are very pitiful people. We depend on everything here in creation to help us survive and live a good way of life. If we weren't here, everything would be doing just fine. It's not the resources that are dependent on us, it's the other way around. I think too many people forget that nowadays." (Participant 10).

Reciprocity

This understanding of interconnectedness and the role that all species play in a healthy environment extends to humans. Tribal members are instructed not to take more than they need and that their actions impact the natural world. For example, when harvesting wild rice, some seeds naturally fall back into the rice beds, thereby helping reseed the beds and providing food for invertebrates, birds, mammals, and other wildlife. This is part of their teachings about how to harvest wild rice: "And then you're also harvesting for those little birds that are out there that are also helping too. You're knocking rice off into the water. You're seeding, too. It's a big process of reciprocity." (Participant 10). This reciprocity means "[b]e mindful of what you take . . . and what you give back—that's the most important part." (Participant 8).

When speaking of hunting and fishing, tribal members spoke of how the deer or the walleye sacrificed itself for humans and it was only right that they give thanks for its sacrifice. This is done by offering tobacco before taking anything from the land or water. "There are a lot of ceremonies and rituals involved in that way of life . . . . You don't just go out there and start harvesting. You put your tobacco in the water and offer prayers." (Participant 3). Similarly, a female elder described the value of being able to interact with resources in their natural environment: "Having it [natural resources] right there available to you, being able to touch it, put your tobacco by it and thank it for everything it's done. That is something that is significant in our culture and among our people." (Participant 12).

This give-and-take with the natural world and notion of selflessness is also embodied in the practice of sharing the harvest with family and members of the wider community. According to one tribal member, "You're out there and you're not just harvesting for yourself: I mean, you're harvesting for your extended kinship, your clan systems, your aunts, uncles, your way extended

relatives, your community in general." (Participant 10). Sharing and being a provider is an important part of identity: "Someone that can take care of his or her people. To take that away, that would be very detrimental to the foundation of who we are." (Participant 10).

Stewardship of the Land

The community's relationship to the environment grounded in values of reciprocity leads to a strong commitment to land stewardship. Given the history and importance of treaty rights in the ceded territories, land stewardship extends beyond the Bad River Reservation:

> We are the caretakers of these areas [in northern Wisconsin, Michigan, and Minnesota] and we know that. Because of our unique sovereign status and our ability to protect things at a higher level. Here on the reservation we have a long, rich history of protecting different areas and we continue to do so to make sure that it's not just the water that's protected. (Participant 10).

Other members described particular activities that demonstrated the importance of stewardship, including preserving land from development, fighting to prevent mining projects in the region, demanding pipeline operators prevent spills, regulating harvesting practices to let rice reseed, and working to prevent overfishing. One participant demonstrated pride in such efforts, noting that "if you look on Google Earth, you can see the outline of our reservation, distinctly, because there's nothing but trees on it." (Participant 12).

Participants communicated a contrast of the values found in Anishinaabe teachings with those demonstrated by modern society. They shared that "at the very foundations of our spirituality, we're taught to live in harmony and balance with the four orders of creation, Mother Earth, and also never to take more than what you need, so that you don't over-exploit those resources in excess, for money like corporate interests do." (Participant 3).

Specific Ties to Bad River Reservation

Specific locations on the Bad River Reservation form the foundation of many members' connection to the environment. Among the locations our participants identified as important were the Kakagon Sloughs, Waverly Beach, Madigan Beach, Bad River Falls, the shores of Lake Superior, and burial grounds on the reservation. Just as common, however, were general ties to the reservation that were not linked to specific locations. We noted how many members cited the waterways or "the water" when asked what part of the reservation they would most like to protect because there was a recognition that the "quality of water determines the quality of life." (Participant 15).

"We come from a long line of oral history...and it has been prophesied that when we can't rice anymore then our people will perish."

Many others felt their connection to the reservation through the taste of wild rice or practice of harvesting it. One person described giving wild rice to tribal members newly released from prison:

> [Wild rice] is one of the things that is given to every person that has come out because they have gone several years sometimes without eating it. That brings them to tears, just the taste of the food. When I saw someone do that, I asked, what makes you cry about this and they said, 'It's the connection. This taste reminds me of home.' (Participant 12).

Treaty Rights

Treaty rights play an important role in the lives of members of the Bad River Band and reinforce the connection to the environment and to their identity as Native Americans. As stated by one tribal member, "That ability to harvest in these areas is very important because it rekindles our relationship with everything in creation." (Participant 10). Tribal members access the ceded territories to harvest wild rice, gather berries, and hunt and fish, when resources are lacking on the reservation itself.

Looming in tribal memory is a period known as the Sandy Lake Tragedy, when hundreds of Ojibwe died of starvation and disease in 1850–1851 after federal agents failed to make the annuity distribution required by treaty. The Sandy Lake Tragedy ended the attempted removal west and strengthened Ojibwe resolve to remain in their traditional homeland. The resulting Treaty of 1854 established the reservations and continued use of the ceded territories. The Sandy Lake Tragedy and other failures to uphold treaty obligations demonstrated that the tribe's survival could not depend on non-Natives. Accordingly, having independent food sources and exercising treaty rights in the ceded territories promote food sovereignty and self-reliance. As one participant noted, "I think [treaty rights] is something that has to be really protected. . . . We have always gone through a lot of strife just trying to get clean water." (Participant 9).

In addition, the exercise of treaty rights through hunting, fishing, and gathering reaffirms the independence of the Band River Band and their particular sovereign status within the United States. It is a reminder that the tribe has never relinquished ties to its ancestral land and that its history on the North American continent goes back much farther than the arrival of Europeans.

Treaty rights have also been used as a mechanism for conservation within the reservation, the ceded territories, and beyond, as is illustrated by the following statements:

- We have reserved treaty rights especially here, and close by where we live and I feel that there would probably have been a lot more environmental destruction if our treaty rights had not been upheld. It is because of that we were able to lobby for Clean Water Act authority, Clean Air Act authority, because of our treaty rights. We have been successful, not the tribe necessarily, but tribal members, in bringing attention to issues such as [mining companies] injecting acid into the White Pine Mine that was only a half mile from Lake Superior, or injecting sulfuric acid into the earth. (Participant 14).

- [W]e've got rights all the way down the northern third of the state, so these treaty rights will protect everybody here. Because if we threaten to take them to court because our treaty rights are violated, we've got a case. The treaty rights protect the environment, not just for Native people, but for everyone, at least those that live in the ceded territories. So we get a lot of support from non-Native people, especially from groups like Sierra Club, Nature Conservancy, and other environmental groups, as well as individuals. (Participant 3).

Potential Impacts of Adverse Environmental Events

Interview participants identified both short and long term environmental stressors that might impact cultural practices, including climate change, flooding, unsustainable harvesting practices, pollutants, pathogens, invasive plants, mining, and the pipelines that run through the reservation.

As described below, the potential impacts of these threats can be divided into impacts on culture and impacts on health.

Cultural Impacts

The importance that the Bad River Band places on natural resources means that loss of (or diminished access to) these resources poses a distinct threat to tribal members' lifestyle and cultural identity. Such loss would impact several aspects of the community's culture, including its sense of place, the availability of resources for traditional practices, oral tradition and teachings, and aspects of the Ojibwe language.

Migration Story

The availability of culturally significant resources is connected to the tribe's migration story and prophecies from the Creator. The potential loss of these resources has an impact on beliefs, tribal identities, and sense of place on Bad River Reservation:

- Then comes the story about what our creation story is and actually how we came to be here, because of the food on the water. It brings a whole different dynamic into the emotional part. The uncertainty. Because we don't know. This is new for us. No wild rice? Wow, that's a scary thought. I don't know. I don't know how I would react. It would definitely be an emotional time. (Participant 7).

- I do not believe that's what the Creator has set out for us. I believe that the Ojibwe are strategically placed along the Great Lakes. . . . It would be like losing faith, watching it happen. What would we do? We would be falling apart. We wouldn't be connected to that creation story. (Participant 19).

- We come from a long line of oral history . . . and it has been prophesied that when we can't rice anymore then our people will perish. (Participant 17).

Ceremonial Foods, Materials, and Practices

Ojibwe people are traditionally hunters and gatherers. The harvesting of wild rice, sugaring, and methods of fishing are changing and could be further impacted by climate change and other adverse events. When considering the impact of diminished resources, it includes the possible loss of traditional methods of harvesting, fishing, and creating culturally important objects.

The abundance of rice on the reservation has changed over time. Elders described navigating with boats through narrower, denser channels in the rice sloughs when they were younger. The channels are now much wider, which is an indication that the volume of rice has decreased. One participant also noted that the increase in humidity has impacted her ability to dry out the rice in the sun. When drying the rice now, she has been required to stay at home and monitor the rice closely to cover and uncover it based on humidity. These changes in seasonal climate and subsequent adjustment to drying methods only occurred during the last 4-5 ricing seasons (Participant 5).

Seasonal changes have also impacted maple sugaring. Tribal members described periods of unseasonably warm periods in late winter. The warm temperatures initiate the running of the maple sap and tapping now begins earlier than in the past. The time available to tap trees has shortened from four weeks to two weeks. In some cases, the warm temperatures were followed by cold temperatures, damaging the sap. These changes impact amount of sap, the tree tapping schedule, and the viscosity and quality of the maple syrup.

Tribal members fish using hook-and-line, spearing, and netting methods. Participants shared that spearfishing is especially tied to the walleye because they can be seen at night. If walleye were no longer available, there is a fear that the traditional practice of night-time spearfishing would become obsolete:

"Much like you go to the hospital when you're sick, many of our people take to the woods because they know that's what's going to help them."

> It's always concerning when you can't rely on a species anymore, especially like walleye or something. . . . We would adjust, again, but I think it would definitely hurt some of our traditions. Spearing would be deeply impacted. The other fish don't light up like walleye. There's a reason we spear for walleye. (Participant 7).

Vulnerable species are also used for the creation of art and other traditional tools and objects. This includes but is not limited to baskets, textiles, ceremonial regalia, beading, canoes, lacrosse sticks, and snowshoes. One local artisan expressed her concern that she may not be able to hand-harvest the black ash she uses to make baskets and other ceremonial objects if the black ash trees were to die out. (Participant 5). Her concern is well founded: the Bad River Reservation Natural Resources Department expects that emerald ash borer, a non-native insect that is highly destructive to North American species of ash, will reach the Bad River Reservation in twenty to thirty years.

Teaching Younger Generations

While hunting, fishing, and harvesting, members use the time to pass on stories and teachings to the next generation. These opportunities to learn about the natural world around them and to share tribal beliefs and Anishinaabe identity are lost when substituting with store-bought food. The following passages demonstrate the importance of passing on knowledge and the emphasis on providing experiences for young people to build connections with the natural world and to learn tribal teachings:

- [Young people] may never be able to fully experience what it is like to harvest that birch from that first cut to sitting in that canoe on one of our rivers or lakes here like our Anishinaabe people have done for thousands of years. I really don't think that's replaceable in any way, shape or form… that harvesting aspect is really ceremonial to us in a way. It's our chance to rekindle or maintain that relationship we have with the manidoog or the spirits. (Participant 10).

- What is that life going to be like for them [younger generations]? They won't be able to do what we're doing . . . . Those things make you Anishinaabe. What does that make you if you aren't practicing them or attuned to them? (Participant 17).

- When we tell those stories then, and we don't have that tree to say, 'And that's the birch tree right there. And this is the birch.' And showing pieces of the tree, of the bark, to our little people, our young people, then they don't know what the heck we are talking about and it isn't significant any longer. And that's really sad. When something of such significance that helped us through so many years to be able to live a good life is no longer available for our little people, our young people to see, and hold and smell and stand there and peel all the bark off . . . that's what I used to do as a kid. It's difficult. It's difficult to fathom how we can pass the story on when we're telling a story and saying, 'and then he got into this birch bark canoe' and you're like, 'what is a birch bark canoe?' 'Well, come to the museum and I'll show you that birch bark canoe right now'. . . and that's the only way they're going to be able to see it. (Participant 12).

Language

The traditional practices of hunting and gathering are interconnected with the Ojibwe language (*Anishinaabemowin*). Algonquian languages and specifically Ojibwe are polysynthetic and often indicate specific characteristics of a species or time of year to harvest. For example, the name of the month parallels the historical timing of harvest which could be impacted by climate change. If climate change results in reduced snowfall or different snow patterns, what does it mean for the *Onaabdin-Giizis* (Snowcrust Moon), that occurs in March? Participants communicated the interconnection between key Ojibwe descriptors and changes in the environment:

- When we lose that ability to identify things, we also lose the language that goes along with that too. Our language is very descriptive so we have different ways to describe, you know different types of cedar…All the intricate words that would go along with that would be lost too. So I kind of look at it like a chain reaction. (Participant 10).

- If you see more and more people getting back into the language well maybe there's a chance they can get back into that craft too. But if those plants are gone, then what does that mean? Because a lot of the language, the roots are tied to describing that plant or that animal or that part of nature that connects that person to that thing or activity. So, if that plant is gone, or if that tree is gone, or if that species gone, then what does that mean for the word and then what does that mean for the language and then how do we connect to nature? (Participant 5).

When prompted to consider the loss or diminished access to key species (wild rice, fish, trees, medicinal plants, game), community members used descriptors such as "scared," "devastated," "shock," and "sadness." These descriptors indicate the magnitude of the potential non-economic loss and damage related to culture, traditional practices, and teachings.

Physical Health and Mental Health

Additional consequences of adverse environmental events only partly captured by economic metrics include impacts on physical and mental health. As described by a tribal member, "for the community here, if there's an abrupt end to resources, like wild rice, it would be economically devastating to them, spiritually devastating, and emotionally devastating" (Participant 12).

Changes in lifestyle, increased access to modern food amenities, and the introduction of food commodities has significantly impacted the diet of native people. One tribal elder explains these changes:

> Maple syrup and wild rice and so on are actually our health foods. These people who live at the poverty level and eat these commodities and all of these starches and everything, are no longer healthy. . . . When I think of my grandfather's generation and even beyond that, those old guys used to pack their deer out of the woods. They didn't drag them out. They'd put them on their back and pack them. They were strong enough to do that . . . . You eat a diet of wild game and different foods that you gather out of the forest. . . . The diet of native people has changed. All people, really. (Participant 3)

Potential loss of these food resources due to climate change or other environmental damage will accelerate the substitution of traditional foods with store-bought food and lead to additional health risks.

There are also health risks related to water quality, pollutants, and introduction of other pathogens. For example, chronic wasting disease (CWD) has been found in deer species in southern Wisconsin and may arrive north. As described by tribal member, there are "very few studies on how that [CWD] affects the human system too…it used to be if you shoot a deer it would be good for you, now if you shoot a deer it may not be good for you" (Participant 10).

Tribal members suggested that loss of land, species, and traditional lifestyles also have mental health implications. One tribal elder shared that "elders are experiencing grief related to the loss of rice. They try to bring elders out [to the rice beds] but they don't go because they don't want to see what has changed" (Participant 11). Another elder described that the "loss of a resource is just the same as the loss of one of your relatives…it's deeper than thinking of them as resources in that way. It means a part of your teachings, a part of your culture, is not going to be there." (Participant 14). This description of grief and loss indicates a deep social-emotional connection to natural resources and reflects the potential mental health impacts of environmental change. Tribal members shared that healthy living and overcoming social issues related to historical trauma, poverty, incarceration, and drug and alcohol use can be achieved by maintaining a proper relationship with the environment:

> All of our seasonal practices are directly tied to *Mino-bimaadiziwin*, or the good way of living. You know, we're not just talking about our health as it pertains to staying away from diabetes and blood pressure and what not, but we're also referring to mental health and maintaining sobriety. Because a lot of these seasonal practices help our people to fight those things—addictions, drugs, and alcohol. . . . Because a long time ago when our people would get sick, everything that we ever needed was in the woods. . . . Much like you go to the hospital when you're sick, many of our people take to the woods because they know that's what's going to help them. (Participant 10).

Adaptation and Resilience

When asked about potential threats to cultural practices that might arise from climate change, nearly all interviewees responded with examples that exhibited adaptation and resilience. Several interviewees revealed these traits through a personal willingness to modify behavior (such as travelling to the ceded territories or substituting species) in order to continue valued practices. Others spoke instead of the ability to effect change through some manner of collective action (e.g., organized advocacy, actions of the tribal council). For many, adaptation and resilience are traits possessed by the Ojibwe people. These characteristics are revealed through traditional stories and teachings.

Willingness to Travel

Common among many respondents was a willingness to travel in order to continue to participate in traditional activities such as harvesting wild rice and maple sugaring. Where particular species are important to a practice or tradition (e.g., walleye fishing, building birch canoes), virtually all interviewees indicated that they would search off-reservation to find such species if they became locally unavailable. Many people have already done so and described traveling to the ceded territories to harvest wild rice.

However, tribal members perceive that there are economic barriers to accessing natural resources in the ceded territories, as noted here:

> If it's not your livelihood, you're not going to go way out of your way to get it unless you're using it to make a living or really need it for ceremonial purposes. . . . Say I wanted to harvest birch bark, but did not want to solely rely on the reservation, I would be willing to go into the National Forest to harvest my bark. But for a lot of people that is very difficult, not a lot of people own vehicles or have the access to get into the woods or National Forest to harvest. (Participant 1).

One anticipated effect of climate change is that various species decline or shift in range, particularly boreal species, such as paper birch or spruces. For Bad River Band members, the risk is that prized species shift entirely away from reservation and ceded territories. Such a change would impact the ability of the tribal members to harvest culturally important resources within fixed treaty boundaries. National boundaries already restrict tribal members from travelling north to Canada to find natural resources.

Species Substitution

While particular species of plants and animals are centrally important to Ojibwe teachings and cultural practices, some respondents displayed a willingness to substitute another species for those whose existence may one day be in jeopardy. One participant considered tapping birch trees for sugar if maples were to disappear. The source of his willingness is the importance he places on the practice rather than the product. Although this participant does buy sugar at the store, the process of making sugar from scratch and sharing the experience with his children is as important as the ultimate product (Participant 7).

Another participant expressed a preference for the black ash tree in making crafts, but noted that other species may be acceptable. Adapting to changes in the availability of species means attempting to understand lessons that nature might be trying to teach her, "maybe there is another tree out there that really wants to be woven with or to be used." (Participant 5). Similarly, one elder indicated that substituting one fish species for another posed no problem for ceremonial purposes. She commented that she had never heard that only a particular fish species must be used (Participant 14).

Collective Action

Tribal members spoke of taking collective action that demonstrated their adaption and resilience. At times, such collective action manifests itself as advocacy or other cooperative effort. One participant told the story of the 1996 response to efforts by a Canadian mining company to transport a trainload of sulphuric acid across the Bad River Reservation, and how "our Bad River *Ogichidaag*, our warrior society, went down and blockaded the tracks for 28 days and brought [the mining company] to the negotiating table." (Participant 3).

Many tribal members spoke of their role as a protector of the environment even beyond the reservation and ceded territories: "[Being a protector is] not even just for the entire ceded territory, [but also] the U.S. as a whole. We had members from Bad River go up to Standing Rock,[16] and that's way beyond ceded territory." (Participant 18). Participants emphasized the importance of being united in protecting and maintaining the quality and longevity of the land. Another participant shared her experience at the People's Climate March in Washington D.C. in April 2017, saying, "It was amazing. . . To be one of the folks that was right there, and engaged and directing, it was pretty powerful. . . I wanted other people to feel that, especially in my community." (Participant 17).

At other times, resilience is demonstrated through actions taken by the Bad River Tribal Council, the Department of Natural Resources, or other tribal leaders. Examples include the council's decision to suspend wild rice harvesting in 2007 and 2012, efforts by the Department of Natural Resources to manage invasive species, and the operation of a fish hatchery to stock and preserve fish populations.

Identity as Resilient and Adaptive People

Many interviewees grounded their responses to the threat of environmental change in an understanding of the Ojibwe people as resilient and adaptive communities. This self-identification developed from their history as a semi-nomadic people, from tribal teachings (e.g., the migration story), and from a shared understanding of historical events impacting the Bad River Band (e.g., the Walleye Wars, pipeline protests, etc.). The following quotes provide examples of this identity:

- Our people are extremely adaptable. We've adapted to a lot of different things, and we're survivors. We've survived a lot of things in our history of Anishinaabe. We've survived attempted relocation, assimilation. People have survived massacres, you know? And we've overcome all of that. We're still here. (Participant 10).

[16] From April 2016 to February 2017, protestors gathered near the Standing Rock Indian Reservation to protest the threat posed by the Dakota Access Pipeline to the Standing Rock Sioux's water supply and burial grounds.

- Like most nomadic people, we exhaust the resource until it gets so bad we can't survive, and then we just pick up and move to a new more resourceful area. (Participant 15).

- They never said that it was forever, that we would make our home there. What they said is for many many many years, that we would make our home here. Because of the rice. That [disappearance of wild rice] is sort of an indicator that we may have to continue to move. . . . If something significant again comes of that context, we will continue to move then. (Participant 12).

- Originally, the people lived in the western Great Lakes area until hard times fell upon them, and they migrated all the way to the great salt water barrier, the Atlantic Ocean. They lived there for strings of lives until hard times fell upon them again. So in dreams and visions they were given signs to follow and told to prepare for a migration. (Participant 3).

Implications for Bad River Band

To monitor climate change impacts on these resources, the Bad River Band developed its Seventh Generation Climate Change Monitoring Plan in 2016, keeping in mind the physical, biological, and cultural impacts of climate change and the cost of the monitoring. This section addresses how the Bad River Band might use the findings of this report to re-affirm or alter their natural resources planning.

External Communication and Outreach

The Bad River Band's existing Climate Change Monitoring Plan accounts for the cultural importance of certain species by prioritizing monitoring measures for these species. Our findings reinforce the priorities given in the Monitoring Plan. However, the Monitoring Plan, as an internal document, does not elaborate on the specific cultural heritage traditions or the magnitude of their importance to the community. We believe that including personal reflections or stories from members of the community will help to explain potential risks to cultural heritage from climate change when collaborating with federal and state agencies and non-governmental organizations to address environmental issues. In addition, the material is particularly useful in communicating with non-tribal members and the general public who are uninformed about the culture of the Bad River Band. The band may also find it useful to use clips from these recordings in social media, website, or other campaigns addressing environmental issues of concern to the community.

Determining Adaptation and Mitigation Approaches

As the Bad River Band continues to develop its climate adaptation and mitigation planning, our findings may also help determine what approach (e.g., adaptation vs. mitigation) to implement. For example, some potential cultural impacts may be avoidable through adaptation—by changing practices or substituting species. However, adaptation may be inappropriate or even traumatic, especially if the adaptation would necessitate amending the traditional teachings. In that case, the focus should be on mitigating—to the extent possible—the effects of any potential losses.

To make this determination, it is important to ascertain whether it is the species or the practice that is more important to the community. For example, is it walleye or is it the practice of fishing for walleye that is more important? If it is the practice of fishing rather than the walleye itself, then efforts to stock walleye may not be as important to the community as generalized efforts to maintain water quality. Or, if the walleye itself is culturally important, then efforts to maintain the stock should be continued. Different community members we spoke to had different perspectives on such questions.

On the other hand, our findings indicate that some species are so important that substitution may be unimaginable. Wild rice, for example, is so foundational to the band's migration history and tribal members' sense of belonging that substitution, even if possible, would not be suitable. In such a case, mitigation measures (such as temporary suspension of harvesting to allow the crop to regenerate) may be the best way to limit cultural losses. Accordingly, it is important to identify whether species substitution is both practicable and suitable in order to determine which measure is best.

Given the view expressed by some members that invasive species have been put here for a purpose, one adaptation measure might be to develop a relationship with those living further south to better understand what species might be migrating northward and how they might be integrated into existing Ojibwe tradition over time. Likewise, building a relationship with communities living further north might enable continuing access to desired cultural resources that have migrated beyond the reservation and ceded territories. The latter option is complicated by the international border between the United States and Canada, but simultaneously made easier by existing cultural bonds with other Ojibwe bands found on the northern shores of the Great Lakes.

Other existing or suggested adaptation measures that were suggested by interviewees included the following:

- Traveling to the ceded territories to harvest;
- Offering subsidies or van-shares to support tribal members wanting to travel to the ceded territories to harvest;
- Building a seed bank of culturally important plants (already under way); and
- Stockpiling culturally important resources (e.g., cedar for ricing sticks).

Inclusive Decision-making Process

Identifying which culturally significant resources are more suitable for adaptation or for mitigation requires more research than this report provides. In particular, it calls for including more tribal member voices in the decision-making process. For example, only five members of the fifteen-person expert working group that gave input into the Monitoring Plan were identified as tribal members. The remainder came from federal and tribal government agencies and non-governmental organizations. Such an approach would not seem to capture the spectrum of viewpoints held by Bad River Band members.

In our sample, members varied in their opinions about what cultural practices were important to preserve, and these opinions were largely based on whether or not the members themselves practiced the traditional method. The Bad River Band is not homogenous, and each participant provided a unique perspective on acceptable adaptation measures. While for Participant 14, substituting one fish for another for ceremonial purposes posed no problem, there were others, such as Participant 10, for whom the walleye fish species was almost irreplaceable. Such differing perspectives would need to be taken into account by planners and decision-makers.

In addition, although we interviewed some tribal members who live in nearby Ashland, we did not capture many views of tribal members who live off the reservation, who make up the majority of the Bad River Band. Whether adaptation and mitigation planning should address the needs of all tribal members or only those living within the reservation boundaries is an important question we cannot answer given the scope and limitations of the project and our status as non-members.

Tribal Strengths to Harness

The Bad River Band has two key strengths that it can harness to strengthen any adaptation or mitigation measure it undertakes.

First, it has a long history of resiliency in the face of challenges such as attempted removal, forced assimilation, and ongoing discrimination. Tribal members take pride in their identity as a resilient and adaptive people and communicated a sense of hopefulness and engagement. This spirit manifests itself in a willingness to challenge mining or pipeline companies or to assert their treaty rights individually or collectively.

Second, the Bad River Band has a rich oral tradition. Traditional subsistence practices, along with the exercise of treaty rights, help reinforce the tribal connection to the land, water, flora, and fauna. Without these activities, there is a risk that oral teachings will not be passed on or will become fossilized. It was evident to us that oral tradition alone cannot replace direct experiences with the environment and that continuing to promote the traditional ways of life helps keep tribal traditions alive. Oral traditions also help give meaning to changes in the environment so that such changes are not experienced as a loss. Teaching the Ojibwe language and the youth outdoor programs seem to be effective steps towards creating and reinforcing ties to the environment.

Implications for Future NELD Research

In undertaking this project, we sought to conduct a proof-of-concept field test with a community facing environmental threats. We have by no means developed a one-size-fits all approach to evaluating NELD, but we hope our successes and failures can be studied by other researchers in undertaking their own research. We have noted here some of the complexities we encountered when doing our work.

Defining the Community

The Bad River Band is a part of a much larger Ojibwe group—one of the largest indigenous groups in North America. The Bad River Band maintains close cultural and familial ties with other Ojibwe throughout Michigan, Minnesota, Ontario, and Quebec, especially the Red Cliff Band of Lake Superior Chippewa, whose reservation is approximately 55 miles away.

Given the reservation system in the United States, and the resulting separate tribal governments, it made sense to us to limit our research to the Bad River Band. The Band has its own independent Natural Resources Department and its own obligation to combat climate change. No matter how much its members might have culturally in common with other Anishinaabe tribes, it is an independent political entity.

Nevertheless, the Band's broader relationship with all Ojibwe makes it difficult to identify the appropriate cultural group to evaluate. Bad River Band members share cultural practices, such as ricing, and cultural beliefs, such as the oral history of the migration, with other Ojibwe. Additional interviews might shed light on whether Bad River Band members are more or less sensitive to environmental changes than others in this larger group. Would members of the Lac du Flambeau Band, for example, be equally impacted by the loss of sugar maple trees? A comparative study of Ojibwe across many bands would identify any differences, as well as reinforce which practices are culturally meaningful. In addition, other Ojibwe may have different adaptation and mitigation strategies that would be culturally appropriate for the Bad River Band to adopt.

Working with a Native American Community

The Bad River Band are a minority population within Wisconsin and the United States. Only about 1,500 tribal members live on the Bad River Reservation; the majority live off the reservation. Historic and current discriminatory policies by government entities have oppressed Native American lifestyles, livelihoods, and identity. Specific social justice issues related to poverty, high unemployment rates, addiction, and incarceration impact Bad River and other Native American communities. Discrimination against Native Americans remains pervasive and there continues to be distrust between the tribe and the state and federal governments.

This discrimination leads to their voices being marginalized and consequently policy decisions do not incorporate their views. The majority non-Native population may be dismissive of Native American concerns about protection of the environment or may deem traditional practices obsolete and unworthy of preservation. The value of NELD research itself may not be accepted given this discrimination.

Moreover, poverty can mean that tribal members are themselves a big threat to resource conservation. For example, we were told that some tribal members had recently been cutting down and selling birch saplings to non-Native communities to make ends meet. (Participants 1, 20). This has had a noticeable impact on the birch population and also means that there will be fewer large birch trees in the future suitable for making birch bark canoes. There is currently a moratorium on cutting down birch trees (with exceptions for permitted religious or cultural purposes) that will continue until healthy birch populations return, but these accounts are evidence that economic forces may be harming tribal practices as much as or more than environmental forces. Losses from these forces interact with potential non-economic losses from climate change and complicate any NELD analysis.

In addition to these social and economic challenges, the Bad River Band faces environmental threats from mining, pipelines, and invasive species that currently threaten its water and natural resources, making climate change appear to be a less pressing problem. Social issues such as poverty, addiction, and incarceration can compromise their ability to effectively prioritize enforcement and conservation.

Sharing Knowledge with NELD Researchers

None of our research team was Native American and we relied on the willingness of participants to share their knowledge with us. In addition to normal reservations about speaking with strangers, participants may have been reluctant to share specific knowledge with outsiders as a result of widespread extractive research that does not benefit the community. NELD researchers from outside the community must be sensitive to this dynamic when eliciting information to include in climate planning.

Different cultures have different rules about sharing traditional knowledge with outsiders. During the long period of forced assimilation, many Native Americans practiced their traditional ways in secret. Moreover, their traditional knowledge has been exploited and used against them in the past. As a result, many are still understandably reluctant to share traditional knowledge with outsiders. Some practices, such as the Midewiwin sometimes called the Grand Medicine Society, are secret to all outsiders, Native and non-Native alike, and only Native Americans may become initiates.

The cultural practices that are kept secret are most likely to be the cultural practices that the group cares about most. However, if outsiders in federal and state government, for example, are not aware of these cultural practices or their significance, they cannot take them into account when developing climate change strategies that may affect the group. The burden should be on outsiders to make genuine efforts to appreciate the cultural significance of tribal practices if they

are going to make policy choices that affect the community. Without learning about the migration story, for example, non-tribal members may not appreciate that wild rice is as important culturally as it is economically and may incorrectly assume that it can be substituted with store-bought rice.

Differing Worldview

Early on, we had considered holding a focus group that would be given a list of species and asked to rank their cultural importance to the Bad River Band using a Likert Scale. This ranking, we thought, could then be used, in conjunction with customary economic and environmental assessments, to prioritize or re-prioritize climate change mitigation tasks. Due to logistical and time constraints, we did not hold the focus group. We were also leery that a ranking would allow an outsider to convert qualitative information into quantitative data and thereby allow the assignment of a dollar value to the numeric ranking. For example, loss and damage at the highest end of the scale would be recompensed at $1 million, and the next level down at $500,000, and so on. This would have defeated the purpose of studying non-economic loss and damage, which by definition cannot be monetized.

Moreover, it is worth thinking about whether such a focus group could have worked with this community. Many participants spoke of the interconnectedness of all species—human, animal, and plant—and their ties to the air, land, and water. It was often difficult for participants to articulate preferences for one species over another, given this understanding that changes to one will have a ripple effect on others.

Approaches to invasive species offer another example of differing world view, as Ojibwe beliefs might differ from normative natural resource management practices. The Ojibwe language does not include a word for invasive species. Instead, non-native species are considered gifts from the Creator and it is important to understand the Creator's purpose for that species (Participants 12, 19). For example, rather than trying to pull up non-native cattails that threaten wild rice, the community has explored other ways of using the cattails, perhaps as bio-fuel, as a food source, in weaving, or as decoration. Or, perhaps the species serves as a protector or a warning species (also known as "sentinel species") of the fragility of the rice beds.

This different ideology can make it difficult to reconcile tribal practices with the natural resource management practices in use by state and federal governments. It can also lead to miscommunication. A failure to tear up cattails to save the rice beds may not be the result of indifference, but a fundamentally different view of the role of non-native species in the ecosystem.

Indeed, the different worldview reinforces the need for more understanding of potential non-economic losses to communities who do not share the notion that monetary damages are an adequate recompense for their loss:

> We prize clean water, fresh air, pristine wilderness, birds and animals, fish and so on, even more than money or materialism. It is a much different way of thinking. The Anishinaabe worldview is much different than that of the industrialized world. We think in terms of the sacred circle: it has no beginning and no end. (Participant 3).

In the quote that opens this report responding to a question about the monetary value of wild rice ("It's priceless. We can't put a price on it. We won't. It's not for sale."), the tribal elder forcefully asserts that the Bad River Band *cannot* quantify the value of wild rice in monetary terms and *will not* do so. The Band's refusal to participate in such a system exemplifies its determination to maintain a way of life in the face of assimilation pressures.

Relying on Qualitative Data

Our observations and open-ended responses to semi-structured interviews represent qualitative data. Qualitative results rely on the interviewer's approach to shaping the interview and directing the participant. The results also rely on the coder's interpretation of the responses, which can seem more subjective and less credible or reliable than quantitative data. The strength of qualitative data is in capturing the variety, individuality, and vividness of the descriptions that can become sterile when transformed into quantitative data through coding. Qualitative data seems better suited to capturing the emotional impact of cultural loss or change brought about by environmental stressors.

We collected our information using collaborative research methods. We partnered with the community in creating our questionnaire, structuring our interviews, identifying and scheduling participants, and clarifying the objective of the research. Collaborative research work such as this requires time and patience to gain consent and build trust with the community. This is especially important in marginalized communities.

NELD research with similar methodologies cannot be done properly in a short amount of time. This type of research may take longer to complete than environmental or economic assessments, thereby making policymakers impatient for results. Emphasis on cost-benefit analyses or economic impact in legal and regulatory regimes reinforces the preference for quantitative data at the expense of qualitative data that may better express the potential non-economic loss and damage to cultural heritage that is at risk.

Conclusion

Through this study, we explored the Bad River Band's relationship to the environment in an effort to better understand what potential cultural losses they may face in the event of climate change or other environmental transformations. The narratives we collected point to the community's deep ties with certain culturally significant natural resources such as wild rice, walleye, and maple, as well as the role these resources play in creating familial and social bonds and maintaining a social identity. The loss of these resources is unimaginable for some tribal members, and could mean loss of intergenerational ties, loss of language, and cultural disintegration. Strong themes of resilience and willingness to adapt in the face of threats to these resources also ran across the narratives. The Bad River Band has a long history of resilience in the face of discrimination, disenfranchisement, and dispossession; such resilience, in combination with the Band's deep ties to the land, may make it better equipped to resist or adapt to the threats posed by climate change.

The importance our participants placed on these natural resources strengthens the idea that some climate change losses may be incommensurable. While the valuation of these resources is difficult, the process of understanding why and how these resources are valued can lead to more effective climate change decision-making. Studies such as this can form the basis for determining climate change adaptation and mitigation strategies, can inform external policymaking, and can be used to identify sources of resiliency within the community. Studies such as this also add to the larger body of academic work that is documenting these non-economic losses for different communities in an effort to gain recognition for such losses in international policy frameworks.

Appendices

Appendix A

Preliminary Research Proposal to the
Bad River Band of Lake Superior Chippewa

Background Statement

Most climate change research and assessments focus on measuring the potential economic loss from changes in the environment. We want to focus on the potential non-economic losses from climate change or other environmental stressors. These are items that cannot be monetized -- factors like adverse health impacts, reduction in biodiversity, loss of knowledge and language, as well as the loss of identity or sense of place resulting from changes in culturally important landscapes or built sites.

These factors are characterized by the fact that their potential loss makes a substantial and permanent difference to the well-being of those affected. These factors are not effectively addressed in national or international policy frameworks, although researchers and policy-makers have begun to recognize their importance.

Goals/Objectives

The aim of this project is develop a framework to assess potential non-economic loss and damage from climate change. The framework will be informed through the collection of stories from people that actively experience and understand the impacts of climate change on their daily lives. These measures of non-economic loss and damage can then to be used to develop or prioritize adaptation measures that minimize these losses. At a minimum, the framework and assessment will help inform policymakers of the importance of these cultural and social factors to climate change adaptation planning and effectiveness.

Team Introduction

The project team represents graduate students from five University of Michigan - Ann Arbor schools. The following is a list of team members and our faculty advisor. We have included more detailed bios in Appendix.

Katie Proudman, Social Work
Stephanie Dooper, Higher Education
Adam Osielski, Law
Sarah Swanz, Information
Ansha Zaman, Natural Resource Management & Environmental Science
Dr. Stuart Kirsch, Faculty Advisor, Department of Anthropology, LS&A

We have received funding for this project through the Dow Sustainability Fellowship program, operated through University of Michigan Graham Sustainability Institute. Nonetheless. this is a student-directed and self-determined project. We have devised the project objective and scope ourselves. We plan to share our final report with the Graham Institute at a year-end presentation, but we will consult with tribal leadership before any presentation of sensitive materials.

Methodology

With your guidance, we would like to learn about the potential impact of climate change and environmental stressors from members of the community. We can do so through a variety of methods: survey of community leaders and experts, focus group meetings, attending community meetings, and/or one-on-one interviews with community members.

We have attached the topics of our potential questions in the Appendix. These are semi-structured questions that allow participants to respond freely based on their knowledge and experience. Anyone is free to decline to be interviewed. We can offer food for focus groups and small gifts (<$20) as thank-yous for participation.

We would not record (audio or video) any interview without the participant's consent and each participant is free to stop the interview at any time. We would not take photographs or videos of any places, ceremonies, or activities that you direct us not to. Any recordings we do take would be shared with you.

Due to our own academic schedules, we are free to visit the Bad River Reservation for about six weeks from mid-July to the end of August. We will work with you to plan our visits.

During the fall, we would work on analyzing the data we acquired and writing up our report. We expect to complete our report by mid-November.

Possible Deliverables to Community

- Archive of oral histories to record and showcase how the landscape of Bad River reservation and watershed is evolving due to climate change. This could be videos to post on your website or the Great Lakes Commons website (http://www.greatlakescommons.org). Or we can set up a private archive available only to tribal members if you do not want to make it public. We can also help catalog existing recordings.
- Add value to Bad River Band's ongoing climate adaptation and mitigation planning. We can align our questions with the objectives of the Seventh Generation Climate Change Monitoring Plan. We would agree to comply with your data sharing or confidentiality policy.
- We understand that some teenagers are working video production. We would be happy to have them along if they wanted to learn more. We can also offer photography or basic computer lessons to them.
- We will provide you with regular updates on our activities as often as you instruct and we consult with tribal leadership before publication of our final report.

Miigwech - Thank you, we look forward to hearing from you.

Interview Guidelines

Climate Change NELD Project

The following outlines sample questions for the facilitation of the Climate NELD interviews and oral histories. The document is for internal use by University of Michigan Climate NELD team and was developed in partnership with Bad River Tribal leadership, Tribal Heritage Office and Department of Natural Resources.

Pre-recording

- Receive Project Overview and sign Participation Consent
- Complete Participant Demographics Form
- Ensure that participant understand that their participation is voluntary.

Sample Interview Questions *(subject to change based on interview content)*

Background

- Please tell us your name and age.
- How long have you lived on Bad River Reservation?
- Did you grow up on the reservation?
- What is your current job / role in the community?
- Have you seen any changes to the environment -- the land, the water, the weather, plants and animals -- during your lifetime?
- Have you lost or altered any experiences or connections to the environment as a result these changes

Species Checklist

- Do you eat wild rice? Do you know how to harvest wild rice?
    - If the wild rice did not grow, how would you feel about that?
    - Tell us how you felt during the year(s) when you were not able to harvest wild rice.
    - How important is it that your ricing sticks are made of cedar from the reservation or ceded territory?
- Do you eat walleye? Do you know how to fish? What type of fishing (gun, net, spear)? What species do you catch?
    - If there were no more walleye to be caught here, how would you feel about that?
- Do you eat maple sugar or syrup harvested from Bad River? Do you know how to harvest sugar?
    - If the sugaring trees moved north, where would you get your sugar/syrup?
    - How is the season? How many taps do you get? Changes to methods over time?
- Do you harvest birch bark, or, purchase/receive gifts of birch bark items made from local artisans?
    - If the birch tree wasn't able to grow here anymore, how would you feel about that?
- Do you [insert from checklist as appropriate]? Do you know how to [harvest, fish, hunt]?
- If there were no more [deer, sweetgrass, etc], how would you feel about that?
- What values do you find and develop through these activities?
    - Do you have any memories that illustrate this?

Open-Ended Questions

- How far would you be willing to travel to get wild rice or maple sugar/syrup if the plant life moved north, *beyond the ceded territories*?
- What things in the environment are most important to you? How do you protect them?
- What are places (one place) on the reservation you would like to keep pristine? Why?
- How much would Bad River have to change for it to longer feel like Bad River to you?
- Do you think you would ever move away from Bad River? What would that mean to you?

Appendix C

Climate Change Student Project Overview

Introduction to Climate Change Project

We are a team of students from University of Michigan who are studying how changes to the environment might impact your way of life. Changes to the environment -- or climate change -- might mean changes in temperature and rain and snow levels, changes in the availability of fish and game, changes in plants or crops , or changes in water quality. The Bad River Band has long been looking at these changes and developed a Seventh Generation Climate Change Monitoring Plan.

We have developed the research project in partnership with the Tribal Heritage Protection Office and Department of Natural Resources. Our project was approved by the Bad River Tribal Council in April 2017.

What is Non-Economic Loss from Climate Change?

Most climate change research focuses on measuring the potential economic loss from changes in the environment -- the money a fisherman might lose if there are no more fish in the lake. We want to focus on the potential non-economic losses from climate change or other environmental stressors. These are things that you cannot put a dollar amount on -- things like knowledge and language or the loss of identity or a sense of place that comes from changes in culturally important landscapes. These factors are not always addressed in planning documents, and yet their potential loss can make a permanent difference to the wellbeing of a community.

What are we asking from you?

- We would like to collect stories from people like you through focus groups or interviews and ask you questions about your relationship to the environment and how it has changed.
- We would like to speak with you for about an hour. You do not have to answer all of our questions and you are free to end the interview at any time. We understand there might be information you do not wish to share with non-tribal members.
- With your permission, we would like to make a recording of our conversation. The recording will help us with our analysis after our time at Bad River Reservation. We will archive our interviews with the Tribal Heritage Protection Office and you will be able to access them there at any time.

If you would like to participate, we will ask you to complete the consent form on the other side.

Consent Form

The aim of this project is develop a framework to assess potential non-economic loss and damage from climate change. The framework will be informed through the collection of stories from people that actively experience and understand the impacts of climate change on their daily lives. We would like to ask you questions about your relationship to the environment and how it has changed.

We would like to speak with you for about an hour. With your permission, we would like to make a video recording of our conversation. You do not have to answer all of our questions and you are free to end the interview at any time.

The Bad River Band of Lake Superior Chippewa will keep the recording and will have the rights to use, reproduce, and publish the recording for any lawful purpose according to its policies.

What we have learned from you may become part of our written report, but we will not publish any report without first obtaining the approval from tribal leadership.

If you would like to participate in our study, please sign below to indicate that you understand:

(1) The general topic of the questions that will be asked

(2) That your story will be recorded

(3) How your story will be used by the researchers

_____ _____

Name (printed) Date

_____

Name (signed)

Interviewer Name: _____

If you have any questions about this project, please contact any of the following:

- Edith Leoso, the Tribal Heritage Protection Officer, [redacted]
- Devon Brock-Montgomery, the Climate Change Coordinator, [redacted]
- Stephanie Dooper, Student Researcher, [redacted]

Participant Demographic Form

Climate Change NELD Project

We ask that you complete this form so that we get an impression of the people participating in our focus groups or individual interviews. Your individual information will not be shared outside the research group. Summary information from all participants may be used in our final report. Thank you for your participation.

1). What is your gender?

☐ Female ☐ Male ☐ Two Spirit ☐ Gender non-conforming

2). What is your age?

☐ 16-17 ☐ 30-39 ☐ 50-59
☐ 18-29 ☐ 40-49 ☐ 60 and over

3). Tribal Membership

☐ Bad River Band ☐ Other (Please specify:_____) ☐ Non-member

4). Are you currently living on Bad River Reservation?

☐ Yes | ☐ No
If no, please indicate location or approximate distance from the reservation: _____

5). How many months per year are you on reservation?

☐ More than 6 months ☐ Summer Only ☐ Weekends Only
☐ Fishing Season ☐ Rice Season ☐ Only for Ceremonial Events

6). Do you participate in any of the following? Check **all** that apply.

Have Done Before	Still Currently Do (within past 12 months)
☐ Hunt (gun)	☐ Hunt (gun)
☐ Hunt (bow)	☐ Hunt (bow)
☐ Fish (hook and line)	☐ Fish (hook and line)
☐ Fish (netting)	☐ Fish (netting)
☐ Fish (spearing)	☐ Fish (spearing)
☐ Trapping	☐ Trapping
☐ Maple sugaring	☐ Maple sugaring
☐ Gathering balsam boughs	☐ Gathering balsam boughs
☐ Gathering sweetgrass	☐ Gathering sweetgrass
☐ Collecting berries/roots	☐ Collecting berries/roots
☐ Wild Rice (manomin) harvesting	☐ Wild Rice (manomin) harvesting
☐ Harvesting plants for medicinal use	☐ Harvesting plants for medicinal use
☐ Harvesting edible plants	☐ Harvesting edible plants
☐ Birch bark harvesting	☐ Birch bark harvesting

Appendix E

Table 1. Demographics of interview participants.

Demographic categories surveyed	Number of respondents
Gender	
Male	8
Female	11
Age	
18-29	3
30-39	3
40-49	3
50-59	1
60 and over	9
Tribal Membership	
Bad River Band	19
Are you currently living on Bad River Reservation?	
Yes	16
No	3
How many months per year do you live on or near Bad River Reservation?	
More than 6 months	19

Table 2. Overview of past and current participation in traditional practices.

Traditional practices surveyed	Number of respondents: Practiced in the past	Number of respondents: Current practices (last 12 months)
Hunt (gun)	14	6
Hunt (bow)	1	0
Fish (hook and line)	16	10
Fish (netting)	16	9
Fish (spearing)	13	7
Trapping	6	2
Maple Sugaring	17	10
Gathering balsam boughs	10	4
Gathering sweetgrass	9	8
Collecting berries/roots	17	12
Wild rice harvesting	17	9
Harvesting plants for medicinal use	17	12
Harvesting edible plants	14	10
Birch bark harvesting	13	8